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(71) Applicant(s)

British Airways Plc  
(Incorporated in the United Kingdom)  
PO Box 365, Waterside (HB A3), HARMONDSWORTH,  
West Drayton, UB7 0GB, United Kingdom

(72) Inventor(s)

David Charlton  
Robert Douglas Jeffroy  
Philip Guy Howell Morgan  
John Mornement

(74) Agent and/or Address for Service

R.G.C.Jenkins & Co  
26 Caxton Street, LONDON, SW1H 0RJ,  
United Kingdom

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(56) Documents Cited

WO 00/46715 A1

WO 00/02153 A1

WO 00/02152 A2

US 5832454 A

US 4862357 A

(58) Field of Search

UK CL (Edition S ) G4A AUXF

INT CL<sup>7</sup> G06F 17/60

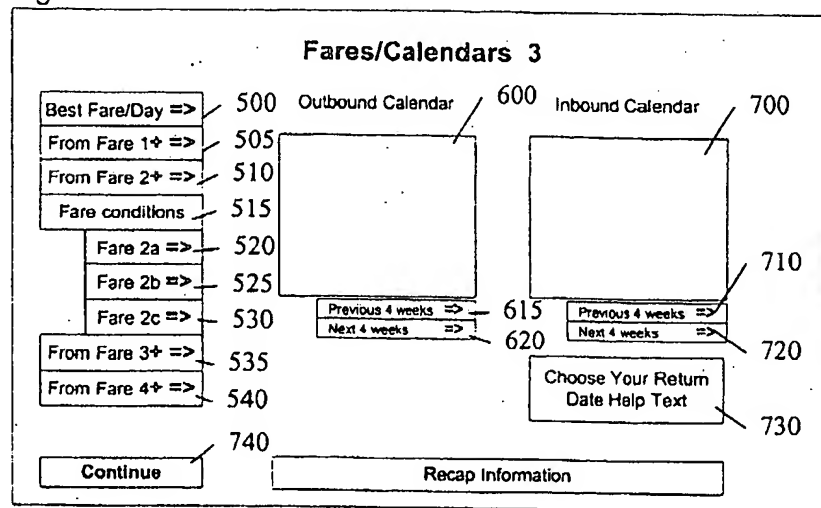
ONLINE: WPI, EPODOC, PAJ

(54) Abstract Title

Electronic reservation system

(57) In a web-based reservation system, the user enters requirements such as routes and date ranges at a terminal and submits them to a web server which retrieves a corresponding data set from a reservation database. The user then enters a query that is applied to the retrieved data set to extract a subset thereof for display. The user may apply further queries to the subset, so as to modify the displayed information. In this way, the user may rapidly find and make a suitable reservation without the need repeatedly to send further queries to the server. The terminal displays fare availability information for a range of different dates and/or times, by means of indicia indicating availability of one or more fare types at the associated date and/or time. This allows the user quickly to comprehend fare availability across a range of dates or times.

Fig. 7a



GB 2 366 403 A

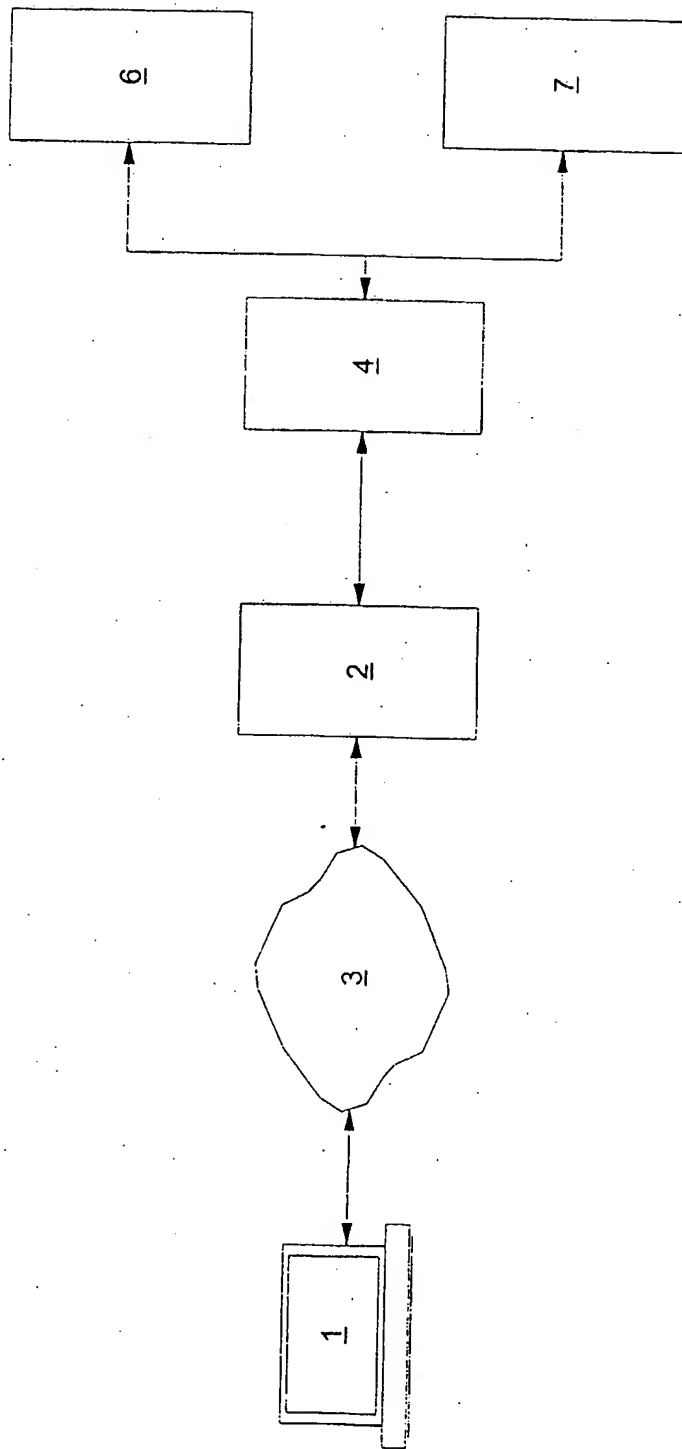


Fig. 1

Fig. 2

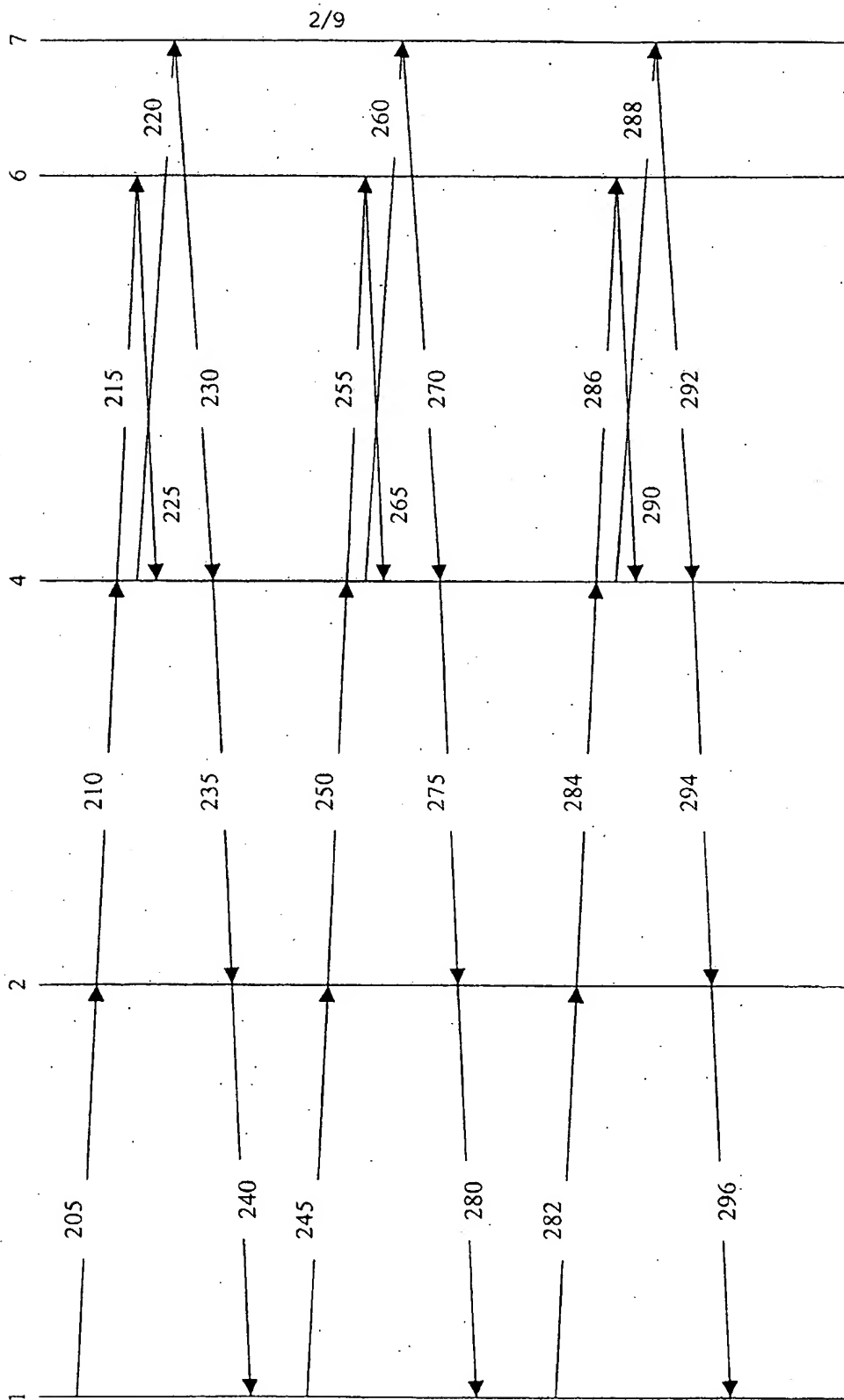


Fig. 3

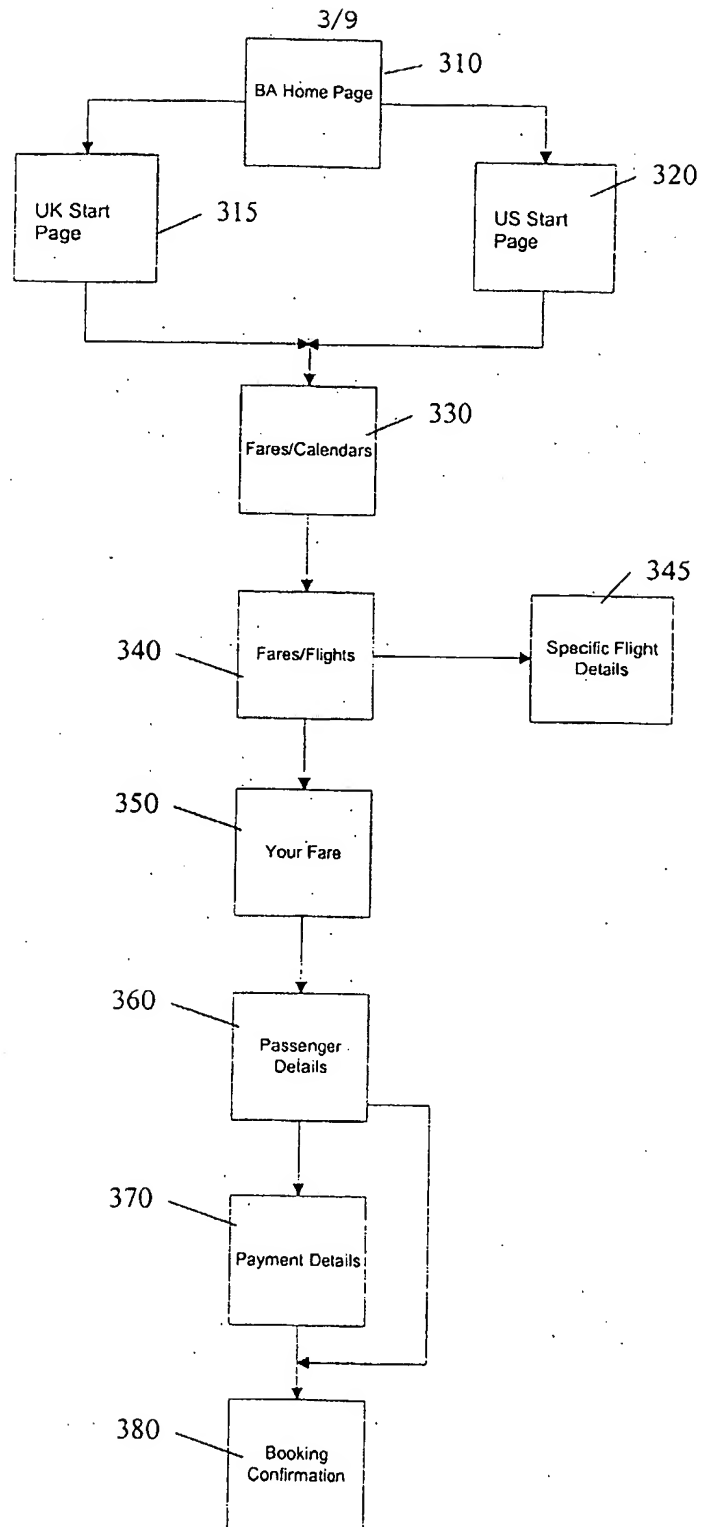


Fig. 4a

4/9

<b>Outbound Date</b> January February March etc	<b>Departure Point</b> Atlanta Baltimore Boston Charlotte Chicago etc	<b>Destination</b> London Manchester	<b>Inbound Date</b> January February March etc
410	430	440	420
<b>Adults</b> <input type="text"/> <b>Children</b> <input type="text"/> <b>Infants</b> <input type="text"/> 450 / 460 / 470			<b>Ticket Type</b> Economy (with restrictions) Economy (flexible) World Traveller Plus Club First Concorde
<input type="button" value="Continue"/> 490			480

Fig. 4b

British Airways - United States - Microsoft Internet Explorer provided by British Airways PLC

**From the United States**

**Book Online: Classic**  
For one way flights and for journeys with stopovers or more complex travel plans worldwide

**Book Online: Fare Explorer**  
For return journeys to the UK only. Explore the full range of available fares. Please note, you will need a version 4 browser or above.

Leaving from:  Departing:

Going to:  Returning:

Select fare type:

Adults:  Children (2-11 yr):  Infants (under 2 yr):

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- 21 US Departure Cities

Select A City

380

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Internet 2000

Microsoft PowerPoint

Fig. 5a

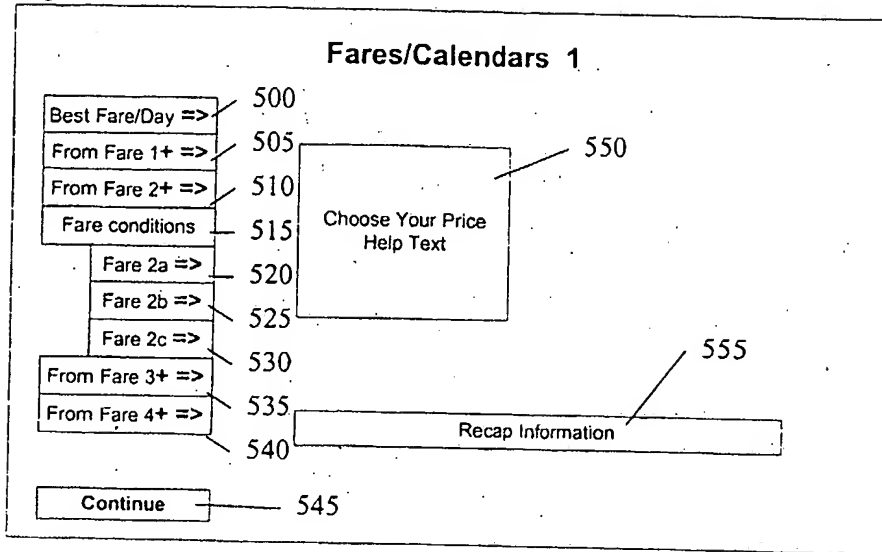


Fig. 5b

British Airways - Fare Explorer - Microsoft Internet Explorer provided by British Airways PLC

**BRITISH AIRWAYS**  
Fare Explorer

**PASSENGERS AND TOTAL PRICE**

ADULTS	1	@	+
CHILDREN	0	@	+
INFANTS	0	@	+

TOTAL PRICE INC. TAX

**OUTBOUND JOURNEY SELECTION**

CITY	Chicago
DATE	
FLIGHT	
DEPART	
ARRIVE	

**INBOUND JOURNEY SELECTION**

CITY	London
DATE	
FLIGHT	
DEPART	
ARRIVE	

**Price Ranges & Features**

Price Features Availability

**CLICK TO SHOW THE BEST AVAILABLE FARES.**

From	Show Features	Traveller Show Availability
\$ 534.80	Features	Availability
From \$ 634.80	Show Features	Traveller Show Availability
From \$ 722.80	Show Features	Traveller Show Availability
From \$ 734.80	Show Features	Traveller Show Availability
From \$ 834.80	Show Features	Traveller Show Availability
From \$ 1,007.80	Show Features	Traveller Show Availability

Thank you for selecting your destination.

Click on 'Show Features' to display fare conditions summary & variations of the fare in the selected colour band.

Click on 'Show Availability' arrow to display a calendar of dates when you can travel.

To book journeys to more than one destination, one way or stopover flights, please [click here](#).

The prices shown are return prices including approximate taxes, fees and charges due. Fares shown are subject to additional charges including but not restricted to passenger facility charges, taxes and fees associated with international journeys. This information will be quoted accurately at Step 3 of the process, once flights are known and included in the total prices shown to you before payment is requested.

If you are experiencing difficulties, please call our customer help desk on 1-800-403-0882

[EXIT](#)
[TERMS AND CONDITIONS](#)
[PRIVACY POLICY](#)

Done Internet zone

Fig. 6a

### Fares/Calendars 2

Best Fare/Day =>	500	Outbound Calendar	600
From Fare 1+ =>	505	<div style="border: 1px solid black; width: 150px; height: 100px; margin: 0 auto;"></div>	<div style="border: 1px solid black; width: 150px; height: 100px; margin: 0 auto; padding: 5px;">           Choose Your Departure Date Help Text         </div>
From Fare 2+ =>	510		
Fare conditions	515		
Fare 2a =>	520		
Fare 2b =>	525		
Fare 2c =>	530	Previous 4 weeks =>	615
From Fare 3+ =>	535	Next 4 weeks =>	620
From Fare 4+ =>	540	Recap Information	
Continue		625	

Fig. 6b

British Airways - Fare Explorer - Microsoft Internet Explorer provided by British Airways PLC
2. EXPLORE

#### PASSENGERS AND TOTAL PRICE

ADULTS	1	@	+
CHILDREN	0	@	+
INFANTS	0	@	+
<b>TOTAL PRICE INC. TAX</b>			

#### OUTBOUND JOURNEY SELECTION

CITY	Chicago
DATE	
FLIGHT	
DEPART	
ARRIVE	

#### INBOUND JOURNEY SELECTION

CITY	London
DATE	
FLIGHT	
DEPART	
ARRIVE	

#### Price Ranges & Features

Price	Features	Availability
CLICK TO SHOW THE BEST AVAILABLE FARES		
From \$634.80	Show Features	Traveller - Show Availability
From \$728.80	Show Features	Traveller - Show Availability
From \$734.80	Show Features	Traveller - Show Availability
From \$834.80	Show Features	Traveller - Show Availability
From \$1,007.80	Show Features	Traveller - Show Availability

#### Departure Date

October 2000

MON	TUE	WED	THU	FRI	SAT	SUN
23	24	25	26	27	28	29
30	31					

November 2000

MON	TUE	WED	THU	FRI	SAT	SUN
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

December 2000

MON	TUE	WED	THU	FRI	SAT	SUN
				1	2	3
4	5	6	7	8	9	10

Click on the date on the calendar when you wish to depart.

The prices shown are return prices including approximate taxes, fees and charges due. Fares shown are subject to additional charges including but not restricted to passenger facility charges, taxes and fees associated with international journeys. This information will be quoted accurately at Step 3 of the process, once flights are known and included in the total prices shown to you before payment is requested.

If you are experiencing difficulties, please call our customer help desk on 1-800-403-0882

EXIT
TERMS AND CONDITIONS
PRIVACY POLICY

Fig: 7a

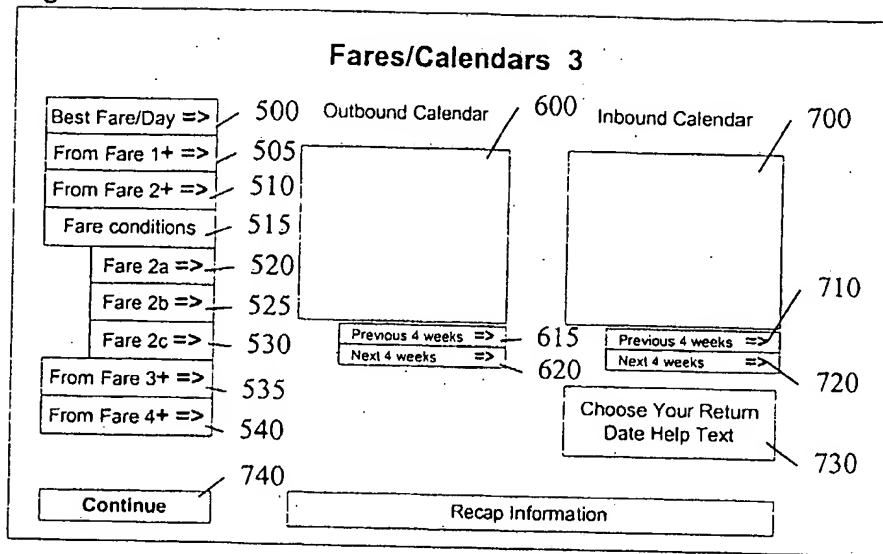


Fig. 7b

British Airways - Fare Explorer - Microsoft Internet Explorer provided by British Airways PLC

**BRITISH AIRWAYS**  
Fare Explorer

**PASSENGERS AND TOTAL PRICE**

ADULTS	1 @	\$ 451	+	\$ 83.80
CHILDREN	0 @			
INFANTS	0 @			
<b>TOTAL PRICE INC. TAX</b>		<b>\$ 534.80</b>		

**OUTBOUND JOURNEY SELECTION**

CITY Chicago  
DATE 3 November 2000  
FLIGHT  
DEPART  
ARRIVE

**INBOUND JOURNEY SELECTION**

CITY London  
DATE  
FLIGHT  
DEPART  
ARRIVE

**Price Ranges & Features**

Price Features Availability

**CLICK TO SHOW THE BEST AVAILABLE**

**FARES**

From \$ 534.80	Show features	Traveller - Show Availability
From \$ 634.80	Show features	Traveller - Show Availability
From \$ 724.80	Show features	Traveller - Show Availability
From \$ 734.80	Show features	Traveller - Show Availability
From \$ 834.80	Show features	Traveller - Show Availability
From \$ 1,097.80	Show features	Traveller - Show Availability

**Departure Date**

October 2000

MON	TUE	WED	THU	FRI	SAT	SUN
23	24	25	26	27	28	29
30	31					

November 2000

MON	TUE	WED	THU	FRI	SAT	SUN
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

December 2000

MON	TUE	WED	THU	FRI	SAT	SUN
4	5	6	7	8	9	10

**Return Date**

October 2000

MON	TUE	WED	THU	FRI	SAT	SUN
23	24	25	26	27	28	29
30	31					

November 2000

MON	TUE	WED	THU	FRI	SAT	SUN
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

December 2000

MON	TUE	WED	THU	FRI	SAT	SUN
4	5	6	7	8	9	10

Click on the date on the calendar when you wish to return, or click on another price band to see more fare ranges.

If you are experiencing difficulties, please call our customer help desk on 1-800-403-0882

EXIT
TERMS AND CONDITIONS
PRIVACY POLICY



Fig. 8a

8/9

**Fares/Flights**

Best Fare/Day	500	Outbound Flights	800	Inbound Flights	810
Fare 1 + ? =>	505	Flight		Flight	
Fare 2 + ? =>	510	Flight		Flight	
Fare conditions	515	Flight		Flight	
Fare 2a =>	520	Flight		Flight	
Fare 2b =>	525	Flight		Flight	
Fare 2c =>	530	<=< Prev day	Next Day =>	<=< Prev day	Next Day =>
Fare 3 + ? =>	535	820	830	840	850
Fare 4 + ? =>	540	Total Fare			860
		Fare Conditions			870
Continue	880				

Fig. 8b

British Airways - Fare Explorer - Microsoft Internet Explorer provided by British Airways PLC

**BRITISH AIRWAYS**  
Fare Explorer

<b>PASSENGERS AND TOTAL PRICE</b> ADULTS 1 @ \$ 451 + \$ 63.80 CHILDREN 0 @ INFANTS 0 @ <b>TOTAL PRICE INC. TAX \$ 1063.6</b>		<b>OUTBOUND JOURNEY SELECTION</b> CITY Chicago DATE 9 November 2000 FLIGHT DEPART ARRIVE		<b>INBOUND JOURNEY SELECTION</b> CITY London DATE 16 November 2000 FLIGHT DEPART ARRIVE	
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**Price Ranges & Features**

Price Features Availability

CLICK TO SHOW THE BEST AVAILABLE FARES

From \$ 634.80	Show features	Traveller - Show Availability
From \$ 634.80	Show features	Traveller - Show Availability
From \$ 728.60	Show features	Traveller - Show Availability
From \$ 734.80	Show features	Traveller - Show Availability
From \$ 894.80	Show features	Traveller - Show Availability
From \$ 1,007.80	Show features	Traveller - Show Availability

Click on your choice of Departure and Return flights, or click on another price band to see more fare ranges

If you are experiencing difficulties, please call our customer help desk on 1-800-403-0882

RETURN TO CALENDARS

EXIT TERMS AND CONDITIONS PRIVACY POLICY

Fig. 9a

### Your Fare

Nr Adults at	Fare + tax	Amount	900
Nr Children at	Fare + tax	Amount	
Nr Infants at	Fare + tax	Amount	
Total Price			

Fare in Euro 910

Fare Rules 920

Local Phone Number

☐ Insurance from Exx 930

[Link to Fare Rules, Terms and Conditions 940](#)

[Add a Hotel 950](#)

Fig. 9b

British Airways - Microsoft Internet Explorer provided by British Airways PLC

**BRITISH AIRWAYS**  
*Fare Explorer*

## Your Flight Price

Below is the price for your chosen flights. Click on "Book Tickets" below to reserve or book these flights. If you would like to view another fare, click on the back button in your browser and select a different flight pair.

To view our fare tips [click here](#).

**Total Price: \$ 1,117.20**

Passengers	Price per Ticket	Flight, taxes and charges	Full Ticket Price
2 Adults	\$ 451.00	\$ 107.60	\$ 1,117.20
<b>Total Price \$ 1,117.20</b>			

**Fare Rules for your 3L tickets:**

- This fare is valid for sale only in the country where the journey begins, and may be different if purchased elsewhere. If you want to have your tickets issued in a different country, please contact your local British Airways office who will quote the correct fare for you in the local currency.
- Before travel commences no refund will be given for cancellation of your booking.
- The departure flight may be changed for the same journey for a charge of \$150.00 up to 45 days before travel commences. From 45 days up to the

**Total Price: \$ 1,117.20**

Passengers: 2 Adults, 0 Child, 0 Infant

Outbound: Wed 08 Nov 2000 17:25  
Chicago (Chicago) to Heathrow (London)  
Flight: BA208  
Depart: 08 Nov 2000 17:25 ORB  
Arrive: 09 Nov 2000 07:20 LHR

Inbound: Thu 16 Nov 2000 15:35 Heathrow  
(London) to Chicago (Chicago)  
Flight: BA207  
Depart: 16 Nov 2000 15:35 LHR  
Arrive: 16 Nov 2000 18:35 ORD

need help?

Internet zone

Start John Gullen Info British Airways United Microsoft PowerPoint utilities Part British Airways M...

## Electronic Reservation System

The present invention relates to a reservation system, particularly to a system for making electronic reservations over a network, such as the Internet.

Various electronic reservation systems have been proposed or are currently in use. For example, 'TheTrainLine.com' is a web-based train ticket reservation system which allows users to specify a departing station, an arriving station, departure and arrival times and dates and a fare type. The system displays the tickets available which meet these requirements and allows the user to select and book a ticket on-line. Frequently, however, there are no tickets available at a suitable time or price. The user may then return to a previous page, alter their specified requirements and submit a new request to the system. Typically, each request involves a considerable delay while a bookings database is interrogated and the new information is downloaded to the user's browser. Moreover, the form in which the database can be interrogated and the results displayed is inflexible.

US 4862357 discloses a dial-up flight reservation system in which a computer is used to access a remote database of schedule, fare and limitation information and retrieve information on flights which meet criteria specified by the user. Flights which meet these criteria are ranked according to the user's travel preferences, stored locally on the computer. Flights for which there is no availability may be excluded.

Web-based fare searching engines such as Travelocity™ and Expedia™ allow users to specify outward and return dates and display a list of fares ranked according to price, or allow the user to search for the cheapest fares without

specifying a date. Travelocity™ also displays a calendar showing availability for outbound flights.

According to one aspect of the present invention, there is provided a reservation system in which a terminal is connectable to a server over a network, such as the Internet. User requirement data is entered at the terminal and submitted to the server over the network. The server retrieves a data set from a reservation database in accordance with the submitted user requirement data, and the data set is transmitted to the terminal, preferably in a compressed form. The user then enters a query which is applied to the retrieved data set to extract a subset thereof, which is displayed to the user. The user may apply further queries to the subset, or may modify the original query, so as to modify the displayed information. In this way, the user may rapidly find and make a suitable reservation without the need repeatedly to send further queries over the network.

According to another aspect of the present invention, there is provided a method of displaying availability for two or more types of interrelated reservations, such as an outbound and a return flight. When a reservation of one type is selected, the display is updated to show availability of the other type of reservation on the basis of rules which govern the availability of combinations of the different types.

According to another aspect of the present invention, there is provided a method of encoding availability information in an array, wherein the position of the availability information within the array determines to what reservation item, such as a day or a specific journey, the information relates.

Specific embodiments of the present invention will now be described with reference to the accompanying drawings, in which:

Figure 1 is a schematic diagram of the main components of a system in an embodiment of the present invention;

Figure 2 is a time diagram of signals passed between the main components in the operation of the system;

5        Figure 3 is a diagram of sequence of screens in operation of the system;

Figures 4a and 4b show respectively schematic and sample browser windows for a start page;

Figures 5a and 5b show respectively schematic and sample browser windows for a first Fares/Calendars page;

10       Figures 6a and 6b show respectively schematic and sample browser windows for a second Fares/Calendars page;

Figures 7a and 7b show respectively schematic and sample browser windows for a third Fares/Calendars page;

Figures 8a and 8b show respectively schematic and sample browser  
15       windows for a Fares/Flights page; and

Figures 9a and 9b show respectively schematic and sample browser windows for a Fare page.

A specific embodiment of the present invention is a web-based system in which users operate terminals which access a web server over the Internet and run  
20       web browser software which provides an interactive display. The protocols by which web-based access is provided, such as http, html and TCP/IP, are well-known in the art and will not be further described except where necessary to explain a specific function of the system.

A system embodying the invention is shown in Figure 1. The system comprises a terminal 1, such as a PC or Macintosh™, running standard version 4 compliant browser software, such as Microsoft™ Internet Explorer™ version 4 or above, or Netscape™ Navigator™ version 4 or above. The terminal 1 is connected  
5 to a web server 2 via the Internet 3, for example via a dial-up PSTN or ISDN connection using PPP to connect to an ISP server (not shown). The web server 2 is in turn connected to a business logic server 4, which is able to query databases stored on mass data storage 5. The databases comprise a flight schedule database 6 and a corresponding fares database 7 together with interface hardware and software,  
10 such as the Phoenix databases operated by British Airways plc.

It is common practice in the airline industry that the ticket allocation for a flight be split between different cabin classes, for example first, business and economy. In general, first class tickets will be more expensive than business class tickets, which in turn will be more expensive than economy class tickets.  
15 Furthermore within each cabin class the airline may split the ticket allocation into different ticket types having different restrictions associated therewith, for example, minimum or maximum stay conditions, advance purchase conditions, cancellation conditions or return flight conditions. In general, the more restrictions associated with a ticket, the cheaper the fare, with tickets with no restrictions being more  
20 expensive.

For historical reasons, availability and price information are usually stored in separate databases. The fares database stores, for each flight, the price of each different type of ticket for the flight. The availability database stores, for each flight operated by the airline, the type of different tickets on the flight, including class and

any restrictions, and for each different ticket type the number of tickets currently available for purchase. Before a booking is made, the availability database is queried to determine whether the requested number of tickets of the requested type is available. Once a booking is made, the number of tickets of that type stored in the availability database is decremented by the booked number of tickets. Schedule data indicating the flight number, the flight route, the date of the flight, the departure and arrival times of each flight are contained within the availability database, but may alternatively be stored in a separate database cross-referenced to the fares and availability databases, or merged within the fares database.

10       The user of the terminal 1 enters requests for information which are sent by the browser software to the web server 2. The business logic server 4 receives requests from the web server 2 and returns the requested flight schedule, availability and fare information from the databases 6 and 7. The web server 2 formats the information together with templates and scripts which are downloaded by the  
15   terminal 1 and processed by the browser software to generate displays for the user:

      The user may use the browser to process the information so as to display a calendar on which the lowest fare available for each date is indicated or alternatively to display a calendar indicating the dates for which there is available a fare within a selected price range. Advantageously, the system allows multiple  
20   queries to be handled at the browser level without each individual query having to be sent for processing at the web server 2. As a further advantage, the browser applies fares rules so that if an inbound or outbound date or flight is selected, the display is updated to show corresponding outbound or inbound dates or flights available according to the applicable fare rule.

A specific reservation transaction will now be illustrated with reference to Figures 2 to 9 of the drawings. Figures 4a to 9a show schematic browser windows, while Figures 4b to 9b show screenshots of the browser windows in operation; these may differ in minor detail from the corresponding schematic browser windows.

- 5 Copyright may subsist in the design of the browser windows and is not waived by virtue of the inclusion of the screenshots in the present application.

A user of the terminal 1 accesses the web server 2 by running the browser, specifying a URL, such as 'www.britishairways.com', and optionally by entering login information and/or following links to a reservation home page 310. From  
10 there, the user follows a link either to a UK start page 315 or a US start page 320, depending on whether the user wishes to depart from the UK or the US. The selection of these pages may be done automatically, for example according to the user's login details or the contents of a 'cookie' stored on the terminal 1.

The format of both start pages 315, 320 is shown in Figure 4a, while Figure  
15 4b is a sample of the US start page 320. The page includes data input fields as defined below in Table 1.

**Table 1 - Input Fields**

Ref.	Field	Type	Default Value	Valid Input
450	Nr of adults	drop down	2	numeric, from 1 to configured maximum (5)
460	Nr of children	drop down	0	numeric, from 0 to one less than configured maximum (4)



470	Nr of infants	drop down	0	numeric, from 0 to configured maximum (5)
410	Date of departure	drop down	Current month	a month (even though a month is selected a predetermined number of days will end up being displayed)
420	Date of Return	drop down	Current month	a month (same as or later than the departure month but before the end of the schedule system range)
430	Departure Point	drop down	Select	city (if on a regional Home Page the list will be limited to cities in that country)
440	Destination	drop down	Select	city
480	Ticket Type	drop down	Select	One of Economy (with restrictions), Economy (flexible), World Traveller Plus, Club, First and Concorde.

The user selects the required options from the drop-down menus. The page may include a script which updates the drop-down menus as options are selected, for example to show only possible destinations in the destination menu for a selected departure point, and vice versa. The user clicks on a 'Continue' or 'Go' button 490 to submit the selected options. The options are transmitted in a compressed format to the web server 2 (step 205) and are then passed to the business logic server 4 (step 210).

The business logic server 4 accepts the requested options and separates the request into a fares database query (step 215) and an availability database query (step 220).

For each specified departure or return month, the business logic server 4 sets a date range in the query to give a predetermined number of days greater than one month, such as 49 or 60 days, centred around the specified month. For example:

Selected month = April 2000

5      Number of days = 49

⇒ date range = 23 March to 10 May

If the start date of the range is before today's date then the date range is set as the predetermined number of days from today's date.

If the end date of the range is past the schedule system's end date then the  
10      date range is set to give the predetermined number of days ending on the schedule system end date.

If the user selected Economy with restrictions as ticket type, the business logic server 4 obtains information for Economy (restricted) and Economy (flexible) ticket types. If other ticket types are selected, the business logic server 4 obtains  
15      information for all ticket types apart from Economy (restricted), i.e. Economy (flexible), World Traveller Plus, Club, First and Concorde.

The business logic server 4 obtains fares records from the fares database 6 (step 225) and availability records from the availability database 7 (step 230), for all outward and inbound flights within the respective date ranges for the selected route  
20      and the ticket types based on the user-selected ticket type as described above. The business logic server 4 then merges the availability records and the fares records into combined availability-fares records, compresses the combined records and sends the compressed combined records to the web server 2 (step 235).

The compressed combined records indicate, for each date within the outbound and inbound date ranges, whether there is at least one flight with the requested number of tickets available for each of the requested ticket types. Hence, the compressed combined records contain information on availability for each day, but not for specific flights within each day. This information is indicated as an array of flags each indicating whether there is availability for one day, with the position within the array indicating to which day the flag applies. For example, the array may have the values:

(000000011110001101000111100011110001111000111100)

showing days 1 to 7 as unavailable as there is a 7 day advance purchase requirement for that ticket type, days 8 to 11 as including at least one flight having the requested number of tickets available at the requested ticket type, days 12 to 14 unavailable as the particular ticket type is not available from Friday to Sunday, days 15 and 16 as having at least one flight with the requested availability, day 17 as unavailable because all of the requested ticket type are sold out or there are no flights with the requested number of tickets available, and so on up to day 49. There is one outbound array and one inbound array for each requested ticket type. The array may be represented as a text string or binary.

The compressed combined records also include two further arrays for each requested ticket type which allow the browser to take into account minimum and maximum stay rules. The Earliest Return Date array indicates the earliest date on which the customer can return if a specific outbound date has been chosen, with the position within the array indicating the specific outbound date. For example, the array may have the values:

(7, 8, 9, 10, 11, 12, 13, 14 ...)

so that, for example, if a customer chooses day 8 as the outbound date then the earliest return date, indicated at position 8, is day 14. The Latest Return Date array is similar, but indicates the latest date on which the customer may return, so as to take into account maximum stay rules.

Hence, the compressed combined records allow automatic application of fare rules by the browser.

The web server 2 sends (step 240) the compressed combined records to the terminal 1 together with executable code, such as Java™ scripts, and formatting information which allow the browser to display selections of information from the combined records according to selections made by the user, in a series of Fares/Calendars windows which will now be described.

The browser next displays a first Fares/Calendars screen 330, shown schematically in Figure 5a; a sample display is shown in Figure 5b. The first Fares/Calendars screen includes the display fields described below in Table 2.

**Table 2 – First Fares/Calendars Display Fields**

Ref.	Display	Notes
505, 510, 535, 540	From Fare	The lowest adult fare for a fare type  Example: From £260
515	Fare Conditions	The conditions associated with the fare type.  (Advance purchase, minimum stay, maximum stay, cancellation permission and charges, rebook permission and charges, valid airports)

		<p>Example: Buy at least 7 days before departure.</p> <p>Must stay over Saturday night.</p> <p>Must return within 1 month.</p> <p>Cancel: Permitted anytime at a charge of 30%</p> <p>Rebook: Not permitted</p>
520, 525, 530	Sub Fare	<p>Exact adult fare for the 'from Fare' fare type based on days of the week and seasonality</p> <p>Example: Leave Mon, Tue, Wed, Thu</p> <p>Return Mon, Tue, Wed, Thu</p> <p>from 04 Feb until 31Mar</p>
550	Choose Your Price Help Text	Text to help the customer to navigate through the screens
555	Recap Bar	Recap information on the options selected so far

Separate display fields are provided for a plurality of ticket types, based on the ticket type chosen, as shown in Table 3 below:

**Table 3 – Ticket Types**

<b>Ticket Type Chosen</b>	<b>Fares Displayed</b>
Economy (with restrictions)	Economy (restricted), Flexible Economy
Flexible	Flexible Economy, World Traveller Plus, Club
World Traveller Plus	World Traveller Plus, Club, First

Club	Club, First, Concorde
First	First, Concorde
Concorde	Concorde

Hence, in the example shown in Figure 5a, if 'Economy Flexible' is the selected ticket type, 'From fare 1' display field 505 displays the cheapest Flexible Economy fare for the route and date ranges selected. 'From fare 2' display field 510 displays the cheapest World Traveller Plus fare. 'From fare 3' display field 535 displays the cheapest Club fare and 'From fare 4' display field 540 is not used.

If the requested ticket type is not available or doesn't exist on the selected route, then the next lower fare ticket type is selected for display instead.

Each fare display field 500-540 is displayed with a background colour corresponding to the ticket type to which it relates. Each fare display field includes at least two buttons, indicated by '+=' and '=>' in Figure 5a and 'Show features' and 'Show Availability' in Figure 5b. Clicking on either of these buttons causes a script to be executed locally by the browser to display information as described below, derived from the combined fares and availability information already received from the web server 2.

The '+/show features' button, when clicked by the user, causes the fare conditions field 515 and sub fare fields 520, 525, 530 to be displayed for the selected ticket type, as shown for ticket type '2' in Figure 5a. The '+/show features button' may be replaced by a '-/hide features' button, which when clicked causes the fare conditions field 515 and sub fare fields 520, 525, 530 to be hidden, as shown in Figure 5b. The sub fare fields each indicate a specific fare available within

the corresponding ticket type. The specific fares differ from each other according to seasonality and whether a flight departs and returns midweek, departs and returns on weekends or departs midweek or at the weekend and returns on the other.

Clicking the '=>/Show availability' button causes the browser to display a  
 5 second Fares/Calendars window 330, as shown in Figures 6a and 6b, including an  
 outbound calendar 600 of the outbound date range, with those dates highlighted for  
 which the selected ticket type is available, preferably with a background colour  
 corresponding to that ticket type.

Each sub fare field 520, 525, 530 includes a '=>/show availability' button  
 10 which, when clicked, causes the browser to display the second Fares/Calendars  
 window 330, including an outbound calendar 600 of the outbound date range, with  
 those dates for which the corresponding fare is available highlighted, preferably  
 with a background colour corresponding to the ticket type within which the fare  
 falls.

15 If the 'Best Fare' field 500 is clicked, the browser displays the second  
 Fares/Calendars window 330, including an outbound calendar 600 for the outbound  
 date range, with each day highlighted with a background colour indicating the ticket  
 type of the cheapest available fare departing on that day.

If the user causes a pointer to hover over a particular calendar date in the  
 20 outbound calendar 600, the actual price of the fare of the ticket type corresponding  
 to the background colour of that date is displayed. Dates for which there are no  
 tickets available of the displayed ticket type or types are shown with a white  
 background and the message 'no seats' is displayed if the pointer hovers over any of  
 them. Dates for which there are no flights for the selected route are also displayed

with a white background and the message 'No Seats' is displayed if the pointer hovers over any of them.

In the Second Fares/Calendars window 330, clicking a 'Previous 4 weeks' button 615 causes the outbound calendar 600 to display the requested fare availability information for the previous four weeks, unless today's date appears in the current date range. Clicking a 'Next 4 weeks' button 620 causes the outbound calendar 600 to display the requested fare availability information for the previous four weeks. In either case, the combined records for the next or previous four weeks are not available locally and a request for these records is sent to the web server 2 and thence to the business logic server 4 for interrogation of the fares and availability databases 6, 7 and the return of a new set of combined records as in steps 205 to 240 shown in Figure 2.

From the Second Fares/Calendars window 330, the user can select a particular departure date and fare by clicking on that date in the calendar, which is highlighted with a colour corresponding to the ticket type of the selected fare. Once the date is selected, a 'Continue' button 625 is displayed. Clicking this button causes a script to be executed locally so as to search the locally stored combined fares and availability records for all days within the return date range for which the requested number of tickets is available at the selected fare and which meet any conditions associated with the selected fare. For example, if the fare has a minimum stay term condition associated with it, then only return days which meet the minimum stay condition and for which there is availability of the requested number of tickets are selected.



The browser then displays the Third Fares/Calendars window 330, as shown in Figures 7a and 7b. The outbound calendar 600 is updated so as to highlight only the departure date set by the user. An inbound calendar 700 is displayed, on which the return dates on which the selected fare is available are highlighted with the colour corresponding to that fare. Thus, the user can see at a glance what return  
 5 dates are available for the selected combination of fare and departure date.

If the pointer hovers over the selected outbound date, the price of the fare is displayed; if over any other date in the outbound calendar, the message 'Not Chosen' is displayed. If the pointer hovers over any of the highlighted dates in the  
 10 inbound calendar, the price of the fare is displayed. If the pointer hovers over a date in the inbound calendar which is not highlighted, the message 'No Seats' or 'No Flights' will be displayed, according to whether there are flights but insufficient availability, or no flights on that day.

The user can then make a new search of the locally stored records for the  
 15 availability of a particular fare or sub-fare, by clicking on one of the '=>/show availability' buttons in respectively the fare fields 505, 510, 535, 540 or sub-fare fields 520, 525, 530. If a particular fare or sub-fare is selected then a script is run to search the locally stored records to determine the departure and return dates within which the selected fare or sub-fare is available for the requested number of tickets  
 20 for at least one flight. The display of the outbound calendar 600 and inbound calendar 700 is then updated to highlight, in the corresponding fare colour, the dates selected by that search.

Alternatively, the user may click the 'Best Fare/Day' button 500, in which case a script is executed to find the lowest fare with availability for the requested

number of tickets, for each day in the inbound and outbound date ranges. The Third Fares/Calendars window 330 is then updated to highlight each date with the fare colour code of the lowest fare found for that day, as shown in Figure 7b. If the pointer hovers over a highlighted date, the price of the lowest fare found is displayed; if over a non-highlighted date, the message 'No Seats' or 'No Flights' is displayed as appropriate.

If a fare, sub-fare or best fare has been selected, the user may then select any highlighted departure or return date by clicking on it. A script is then executed locally to select combinations of the selected departure or return date and respective return or departure dates which meet any terms and conditions applicable to the selected fare. The Third Fares/Calendars window 330 is then updated to highlight with the corresponding fare colour code in the outbound calendar 600 and inbound calendar 700 only the dates of selected combinations. Thus, only the selected departure or return date is highlighted in the appropriate inbound or outbound calendar, while in the other calendar those dates having the requested availability at the selected fare will be highlighted with the appropriate fare code. If the pointer hovers over a highlighted date, the price of the fare on that date is displayed; if on a date not selected in the appropriate calendar, the message 'not chosen' is displayed; if on a date not highlighted in the other calendar, the message 'No Flights' or 'No Seats' is displayed as appropriate.

In the Third Fares/Calendars window 330, clicking the outbound 'Previous 4 weeks' button 615 causes the outbound calendar 600 to display the requested fare availability information for the previous four weeks, unless today's date appears in the current date range, and clicking the outbound 'Next 4 weeks' button 620 causes

the outbound calendar 600 to display the requested fare availability information for the previous four weeks. The Fares/Calendars window 350 also includes an inbound 'Previous 4 weeks' button 710 and an inbound 'Next 4 Weeks' button 720, which, when clicked, initiate a request for a set of combined fares/availability records with an inbound date range respectively decremented or incremented by four weeks. The request is sent to the web server 2 and thence to the business logic server 4 for interrogation of the fares and availability databases 6, 7 and the return of a new set of combined records as in steps 205 to 240 shown in Figure 2. A search is then performed locally on the new set of combined records using the current display selection criteria and the inbound or outbound calendar 700, 600 updated as appropriate.

Once the user has selected an outbound or inbound date and the corresponding available inbound or outbound dates have been displayed, the user then clicks on one of these corresponding available inbound or outbound dates and the respective calendar display is updated so as to highlight only the selected outbound and inbound dates. To confirm this selection, the user then clicks a 'Continue' button 740 to proceed to the Fares/Flights window 340. Otherwise, the user may click one of the '=>/show availability' buttons in respectively the fare fields 505, 510, 535, 540 or sub-fare fields 520, 525, 530 to select another fare or the 'Best Fare' button to go to the lowest fare display.

As shown in Figures 8a and 8b, the Fares/Flights window 340 consists of one or more outbound flight display fields 800 and one or more inbound flight display fields 810, which display details of flights respectively departing on or arriving on the user-selected days. The details are obtained by sending a request to

the web server 2 and thence to the business logic server 4, which interrogates the fares and availability databases 6 and 7 and returns the flight details, as shown in steps 245 to 280 of Figure 2.

The details have a format shown below in Table 4:

Table 4 – Flight Display Field Format

Display	Format	Notes	Example
Departure Point	full city name		London
Arrival Point	full city name		New York
Departure Date	ddmmm		25MAY
Departure and arrival times	hh:mm Leave hh:mm Arrive	append * if next day arrival; append ** if arrival is 2 days later	20:45 Leave 06:00* Arrive
Departure and destination airport codes	3-letter codes, next to related time		LHR JFK
Flight number	BAAnn, displayed as a link	each flight number has an associated link to flight details	BA123 - Flight number can be up to 4 digits.
Operating Carrier	full text	The operator of the flight (may be different from the marketing carrier)	British Airways
Price	Currency		\$534.80

Flights with availability of less than the specified number of tickets include the displayed message 'Sold Out' while those with up to 8 tickets left at the selected fare include the displayed message 'Last Few'.

A script displays the flight information according to the following rules.

Flights only for the selected days are displayed except in the following cases. If the number of flights to display is less than a predetermined minimum (e.g. 5) then the script searches backwards up to a predetermined number of days (e.g. 7) for the first  
 5 earlier date with available flights at the selected fare and forward up to the predetermined number of days for the first later date with available flights at the selected fare, and displays flights for the first earlier date, the selected date and the first later date. If no available flights are available on the selected date, then flights are displayed for the first earlier date and first later date.

10 The flights are always displayed in relation to the last fare selected. Hence, those flights for which the selected fare is available are highlighted with the corresponding fare colour. Flights for which the requested number of tickets at the selected fare is not available are not highlighted, but may instead be greyed out (shown in faint grey text). If the 'Best Fare' option was previously selected, each  
 15 flight display field is highlighted with the colour corresponding to the lowest available fare for that flight. The selected fare type may be changed within the Fares/Flights window 340 by clicking the 'Best Fare/Day' button 500, or the '>/Show Availability' button within one of the fare fields 505, 510, 535, 540 or sub-fare fields 520, 525, 530.

20 The Fares/Flights window 340 also includes an outbound previous day button 820 and an inbound previous day button 840 which are displayed provided the selected day is not today, and an outbound next day button 830 and an inbound next day button 850, which are displayed provided the selected day is not the last day in the current schedule range. Clicking on the appropriate button changes the

outbound or inbound flights display 800 or 810 to show flights on the next or previous day, highlighted according to the selected fare type. If the selection of next or previous day would result in the inbound date being earlier than the outbound date, both the inbound and outbound dates change together.

- 5       The user selects individual flights by clicking on the relevant display field 800, 810. Clicking on an outbound display field 800 when no inbound flight has been selected causes the inbound display fields 810 to be refreshed by highlighting only those flights for which tickets are available at the selected fare, or by highlighting with the colour of the lowest available fare if the selected fare type is
- 10   ‘Best Fare’. The user may then select one of the highlighted inbound flights by clicking on its display field 810.

- Likewise, clicking on an inbound display field 810 when no outbound flight has been selected causes the outbound display fields 800 to be refreshed by highlighting only those flights for which tickets are available at the selected fare, or
- 15   by highlighting the flights with the colour of the lowest available fare if the selected fare type is ‘Best Fare’. The user may then select one of the highlighted outbound flights by clicking on its display field 800.

- Once an inbound and outbound flight have been selected, the user may click on the continue button 880. In that case, the browser sends to the web server 2 the
- 20   following information at step 282, which is then passed to the business logic server 4 at step 284:

Number of adults

Number of children

Number of infants

Identity of outbound flight

Identity of inbound flight

Outbound flight details

Inbound flight details

5 Currencies for quote (maximum 2)

The business logic server 4 then obtains current fare information for the requested flights from the fares database 6 (steps 286 and 290) and current availability information from the availability database 7 (steps 288 and 292) and  
 10 passes this information to the web server 2 (step 294), which forwards the information to the terminal 1 (step 296) in a format compatible with the browser. If the requested tickets are no longer available since the information was last obtained at step 270, the browser displays a message that the requested fares are no longer available, requests an updated set of compressed combined records for the current  
 15 date ranges and returns to the first Fares/Calendars window 330.

The browser then displays a Your Fare window 350 as shown in Figures 9a and 9b, including a fare display field 900 in which the fares are itemised for the requested number of adults, children and infants and the total is displayed at the bottom. An equivalent total fare in a second currency is displayed in an alternative  
 20 currency display field 910. The fare rules applicable to the requested tickets are submitted by the web server 2 and are displayed in a fare rules display field 920. There are different sets of fare rules according to the fare types of the tickets.



As optional features, the web server also submits an insurance price for display by the browser in an insurance display field 930, and the browser displays a hotel-booking button 950, which activates a hotel-booking window.

To proceed with the booking, the user clicks on a continue button 940. From this point, the booking proceeds essentially in the same manner as a conventional online booking, through a Passenger Details window 360 in which the user enters details of the passengers, a Payment Details window 370 in which the user enters payment details in order to pay for the transaction, and a Booking Confirmation window 380 in which, if the payment details are accepted, a message confirming the booking is displayed.

Various alternatives or additions to above embodiment may be envisaged, without departing from the scope of the invention as defined by the claims.

In one alternative, the terminal 1 is a wireless terminal, using communications protocols such as GPRS, HSCSD or UMTS for communication over a wireless network which may provide a connection to the Internet, or be directly connected to a server otherwise functionally equivalent to the web server 2. Application protocols such as WAP may be used. Alternatively, the terminal 1 may be an interactive TV set.

The terminal 1 may be connected to a travel agent's extranet or an airline's in-house telesales network, to facilitate booking on behalf of customers.

The system described above may be modified to allow the booking of one-way flights, for example by allowing the user to proceed directly from the second Fares/Flights window 340 to the Your Fare window 350 once the user has selected

an outbound date. The system may also allow booking of journeys of more than two legs or 'open jaw' flights, and allow connecting flights and stopovers.

As an additional feature, the user may specify an outbound and an inbound date and move directly from the start page 315; 320 to the Fares/Flights page 340.

5 Additional features may be added to allow the compressed combined records to be obtained according to different criteria specified by the user. For example, instead of specifying a fixed departure point and destination, the user may select an option to specify only the departure point and a maximum fare, and the business logic server creates the compressed combined records showing availability at or  
10 below the maximum fare for a range of different destinations over specified outbound and inbound date ranges.

The system described above may be applied to the reservation of other types of travel, such as train travel, and to the reservation of other types of service such as hotels, in which case the outbound and inbound dates would be replaced by arrival  
15 and departure dates. Instead of fare types, different classes of room may be offered and different rates may be applied according to the length of stay and days of the week, for example.

The system may also be applied to the combined reservation of different types of service, such as flight and hotel packages. For example, the browser may  
20 retrieve fares rules and availability for the flights and rates rules and availability for hotels at the destination. This would allow the user to select departure and return dates which give the lowest total cost of the package.

The browser may additionally retrieve from the web server 2 information on events at the departure and destination points within the date ranges. For example,

information on school holidays and local festivals may be displayed on the Fares/Calendars screens 330 so as to assist customers in planning their holidays.

Various other modifications of the specific embodiments may be envisaged, within the scope of the following claims.

## CLAIMS

1. A method of processing reservation data at a terminal, comprising:
  - receiving as input at the terminal a request for reservation information including one or more reservation criteria;
  - 5 transmitting said request over the network to a remote server;
  - receiving from the remote server a set of reservation data selected according to said one or more reservation criteria;
  - receiving as input at the terminal a selection request;
  - selecting for display a subset of reservation data from said set of reservation
  - 10 data in accordance with the selection request; and
  - displaying said subset of reservation data at the terminal.
2. A method as claimed in claim 1, wherein said one or more reservation criteria specifies a date range and the set of reservation data relates to said date range.
3. A method as claimed in claim 2, wherein said one or more reservation criteria
- 15 includes a first date range and a second date range and the set of reservation data relates to said first and second date ranges.
4. A method as claimed in claim 3, wherein the selection request indicates a date within the first date range and the selecting step includes selecting, as said
- subset of reservation data, reservation data relating to a plurality of dates within
- 20 the second date range, dependant on the indicated date within the first date range.

5. A method as claimed in claim 4, including further receiving as input at the terminal a further selection request indicating one of said plurality of dates within the second date range.
6. A method as claimed in claim 5, including submitting to the remote server a reservation request specifying the dates indicated by said selection requests.
7. A method as claimed in any preceding claim, wherein said one or more reservation criteria includes a plurality of reservation types and the set of reservation data relates to each of said plurality of reservation types.
8. A method as claimed in claim 7, wherein said selection request indicates a subset of said plurality of reservation types and said subset of reservation data relates to said subset of reservation types.
9. A method as claimed in claim 8, wherein the set of reservation data includes price information relating to each reservation and said selection request causes selection of said subset of reservation data according to said price information.
10. A method as claimed in claim 8 when dependent on claim 2 or claim 3, wherein said subset of reservation data is selected to comprise the lowest price reservation for each day within the date range.
11. A method as claimed in claim 8 when dependent on claim 4, wherein said plurality of dates are selected according to a selection rule dependent on said subset of reservation types.
12. A method as claimed in any preceding claim, further including:  
  
receiving as input at the terminal a further request for reservation information including one or more further reservation criteria;

transmitting said further request over the network to a remote server;

receiving from the remote server a further set of reservation data dependent on said one or more further reservation criteria;

selecting for display a further subset of reservation data from said set of further

5 reservation data in accordance with said selection request; and

displaying said further subset of reservation data at the terminal.

13. A method as claimed in claim 12 when dependent on claim 2, wherein said further reservation criteria includes a further date range and the further set of reservation data relates to said further date range.

10 14. A method of displaying electronically reservation availability information for first and second ranges of reservable items, comprising:

storing reservation availability records for said ranges;

storing reservation rules relating to combinations of one or more reservable items from said first range and one or more reservable items from said second range;

15 receiving as input a selection of one or more of said items from one of the first and second ranges;

determining amended availability information for the items in the other one of the first and second ranges on the basis of said selection and said reservation

20 rules; and displaying said amended availability information .

15. A method as claimed in claim 14, further including displaying availability information derived from said reservation availability records for said first and second ranges, prior to receiving said selection as input.
16. A method as claimed in claim 14 or 15, wherein said reservation availability records are stored locally.
17. A method as claimed in claim 16, wherein said reservation availability records include an array of availability data, the position within the array indicating the position within the respective range.
18. A method as claimed in any one of claims 14 to 16, wherein said reservation rules are stored locally.
19. A method as claimed in claim 18, wherein the reservation rules are stored as one or more arrays of data, each data value within the array indicating an item from the second range, the position of each data value indicating a corresponding item from the first range.
20. A method of creating a set of reservation availability records for a set of items, including:
- obtaining availability information for each of said set of items; and encoding said availability information as data within an array, the position of the data within the array indicating the item to which that data relates.
21. A method as claimed in claim 20, wherein said items each include a plurality of subitems, the availability information including information relating to each of said subitems, and the data for each item indicating availability if there is availability for any of the subitems included within that item.

22. A method of receiving and displaying reservation availability information for a set of items within a range, including receiving a data array including availability data for each of said items, and displaying the availability data for each of said items, associated with a value within said range derived from the position of the availability data within said array.
23. A set of reservation availability records created by the method of claim 20 or claim 21.
24. A computer program arranged to perform a method according to any one of claims 1 to 13, when executed at said terminal.
25. A computer program arranged to perform a method according to any one of claims 14 to 22, when executed by a suitably arranged computer.
26. A signal encoding a computer program as claimed in claim 25.
27. An electronic travel reservation system comprising a server accessible over a network by a terminal, wherein the terminal sends a request specifying a plurality of dates and a specified route to the server and the server responds with the fare and availability records for the specified dates and route, the terminal then displaying one or more options to select from the requested fare and availability records and displaying a subset of said records according to a user selection of said one or more options.
28. A system as claimed in claim 27, wherein said displayed options include one or more options to select a specific fare type, and the subset of said records comprises records having a user-selected fare type.



29. A system as claimed in claim 27 or claim 28, wherein said displayed options include an option to select a lowest fare and the subset of said records comprises records corresponding to the lowest fare for each of said plurality of dates.
30. A system as claimed in any one of claims 27 to 29, wherein said subset of said  
5 records is displayed by displaying some or all of said specified dates, each with an indicium selected from a set of indicia indicating the availability of a fare type for the respective day.
31. A method substantially as herein described with reference to the accompanying drawings.
- 10 32. A system substantially as herein described with reference to the accompanying drawings.



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Claims searched: 1, 27 and dependent claims Date of search: 14 May 2001

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:  
UK Cl (Ed.S): G4A (AUXF)  
Int Cl (Ed.7): G06F (17/60)  
Other: Online: WPI, EPODOC, PAJ

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	WO 00/46715 A1 ITA (see abstract)	-
X	WO 00/02153 A1 ITA (see whole document, esp claims 1 & 7)	1 & 27 at least
X	WO 00/02152 A2 ITA (see whole document, esp claims 1 & 16)	1 & 27 at least
A	US 5832454 A Jafri (see abstract)	-
A	US 4862357 A Ahlstrom (see abstract)	-

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
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